CLAIMS

What is claimed is:

1. A method comprising:

generating a first representation of a hierarchical relationship among a plurality of first prefixes;

determining an optimized representation of the hierarchical relationship among the plurality of first prefixes;

generating a mapping of the plurality of first prefixes into a plurality of second prefixes based on the optimized representation.

2. The method of claim 1, wherein the first representation includes a trie.

3. The method of claim 2, wherein optimized representation includes a trie.

4. The method of claim 1, further comprising causing an associative memory to be programmed with the plurality of second prefixes.

5. The method of claim 4, wherein the associative memory includes a binary or ternary content-addressable memory.

6. The method of claim 1, further comprising storing the plurality of second prefixes in a data structure.

7. The method of claim 1, further comprising maintaining a data structure indicating the mapping.

8. The method of claim 1, wherein the plurality of first prefixes include a network address.

9. The method of claim 1, including:

determining an ancestor tree based on the plurality of first prefixes; and

determining an optimized trie representation of the ancestor tree.

10. The method of claim 9, including adding a dummy node for each internal node of the first representation.

11. The method of claim 1, wherein the plurality of second prefixes includes a match all prefix.

12. The method of claim 1, wherein the plurality of second prefixes includes a dummy node for an internal node of the first representation.

13. The method of claim 1, further comprising determining a set of mapped lookup values based on the optimized representation.

14. The method of claim 13, further comprising causing the plurality of mapped lookup values to be stored in an associative memory.

15. A method of claim 1, further comprising:

receiving a set of information including a first value;

generating a lookup value from the set of mapped lookup values based on first value; and

generating a lookup word based the lookup value;

16. The method of claim 15, further comprising:

causing an associative memory to be programmed with the plurality of second prefixes; and

initiating a lookup operation on the associative memory using the lookup word.

17. A computer-readable medium containing computer-executable instructions for performing the method of claim 1.

18. A method comprising:

determining a binary trie representation for a plurality of prefixes;

determining an ancestor tree based on the binary trie representation;

determining an optimized trie representation of the ancestor tree; and

determining a mapping of the plurality of the prefixes into a plurality of second prefixes based on the optimized trie representation.

19. The method of claim 18, further comprising extracting the plurality of prefixes from a configuration table.

20. The method of claim 18, wherein the configuration table contains access control, quality of service, or routing information.

21. The method of claim 18, further causing an associative memory to be programmed with the plurality of second prefixes.

22. The method of claim 21, wherein the associative memory is a content-addressable memory.

23. The method of claim 18, further comprising determining a set of mapped lookup values based on the optimized representation.

24. The method of claim 23, further comprising causing the plurality of mapped lookup values to be stored in an associative memory.

25. A computer-readable medium containing computer-executable instructions for performing the method of claim 18.

26. An apparatus comprising:

a programming engine for determining a mapping between a plurality of first prefixes having a hierarchical relationship and a plurality of second prefixes having the hierarchical relationship;

a storage mechanism configured to maintain an indication of the mapping;

translation logic to determine a particular one of the plurality of second prefixes based on a particular one of the plurality of first prefixes; and

an associative memory to perform a lookup operation using the particular one of the plurality of second prefixes to generate a result.

27. The apparatus of claim 26, wherein the programming engine includes an associative memory programmer to program the associative memory.

28. The apparatus of claim 26, wherein the programming engine includes an optimizer for determining an ancestor tree based on the plurality of first prefixes; wherein the programming engine references the ancestor tree when determining the mapping.

29. The apparatus of claim 26, wherein the plurality of first prefixes correspond to a plurality of network addresses.

30. The apparatus of claim 26, wherein the plurality of prefixes are derived from an access control list.

31. The apparatus of claim 26, wherein the associative memory is a content-addressable memory.

32. The apparatus of claim 26, wherein the programming engine is further configured to determine a set of lookup values based on the set of first prefixes.

33. The apparatus of claim 32, further comprising a second associative memory for storing the set of lookup values.

34. An apparatus comprising:

means for generating a first representation of a hierarchical relationship among a plurality of first prefixes;

means for determining an optimized representation of the hierarchical relationship among the plurality of first prefixes;

means for generating a mapping of the plurality of first prefixes into a plurality of second prefixes based on the optimized representation.

35. The apparatus of claim 34, wherein the first representation includes a trie.

36. The apparatus of claim 34, wherein optimized representation includes a trie.

37. The apparatus of claim 34, further comprising means for programming an associative memory with the plurality of second prefixes.

38. The apparatus of claim 34, further comprising means for determining a set of mapped lookup values based on the optimized representation.

39. The apparatus of claim 38, further comprising means for generating a lookup value from the set of mapped lookup values based on a particular value.

40. An apparatus comprising:

means for determining a binary trie representation for a plurality of prefixes;

means for determining an ancestor tree based on the binary trie representation;

means for determining an optimized trie representation of the ancestor tree; and

means for determining a mapping of the plurality of the prefixes into a plurality of second prefixes based on the optimized trie representation.

41. The apparatus of claim 40, further comprising means for programming an associative memory with the plurality of second prefixes.